

[Title of the document] Claims

[Claim 1]

A compound solution comprising disarranged fibers made of a thermoplastic polymer, and of 1 to 500 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios, and a solvent.

[Claim 2]

A compound solution comprising disarranged fibers made of a thermoplastic polymer, and of 1 to 200 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios, and a solvent.

[Claim 3]

A compound solution, according to claim 1 or 2, wherein the index Pb of extremal coefficient of single fiber diameters expressing the rate of the fibers falling within a range of plus and minus 15 nm from the number average single fiber diameter defined as the median is 50% or more.

[Claim 4]

A compound solution, according to any one of claims 1 through 3, wherein the solvent is at least one selected from the group consisting of water, oils and organic solvents.

[Claim 5]

A compound solution, according to any one of claims 1 through 4, wherein the freeness of the disarranged fibers is 350 or less.

[Claim 6]

A compound solution, according to any one of claims 1 through 5, wherein the content of the disarranged fibers is 5 wt% or less.

[Claim 7]

A compound solution, according to any one of claims 1 through 5, wherein the content of the disarranged fibers is 0.0001 to 1

wt%.

[Claim 8]

A compound solution, according to any one of claims 1 through 7, wherein the disarranged fibers are short fibers with a fiber length of 5 mm or less.

[Claim 9]

A compound solution, according to claim 8, wherein the disarranged fibers are short fibers with a fiber length of 0.05 to 2 mm.

[Claim 10]

A compound solution, according to any one of claims 1 through 9, wherein the thermoplastic polymer is at least one selected from the group consisting of polyesters, polyamides, polyolefins, polyphenylene sulfide, phenol resins, polyacrylonitrile, polyvinyl alcohol, polysulfones, polyurethanes, fluorine-based polymers and their derivatives.

[Claim 11]

A compound solution, according to any one of claims 1 through 10, which further contains a dispersing agent.

[Claim 12]

A compound solution, according to claim 11, wherein the content of the dispersing agent is 0.00001 to 20 wt%.

[Claim 13]

A compound solution, according to claim 11, wherein the content of the dispersing agent is 0.0001 to 5 wt%.

[Claim 14]

A compound solution, according to any one of claims 11 through 13, wherein the dispersing agent is at least one selected from the group consisting of nonionic dispersing agents, anionic dispersing agents and cationic dispersing agents.

[Claim 15]

A compound solution, according to claim 14, wherein the zeta potential of the disarranged fibers is in a range from -5 to +5 mV, and the dispersing agent is a nonionic dispersing agent.

[Claim 16]

A compound solution, according to claim 14, wherein the zeta potential of the disarranged fibers is -100 mV to less than -5 mV, and the dispersing agent is an anionic dispersing agent.

[Claim 17]

A compound solution, according to claim 14, wherein the zeta potential of the disarranged fibers is more than +5 mV to 100 mV, and the dispersing agent is a cationic dispersing agent.

[Claim 18]

A compound solution, according to any one of claims 11 through 17, wherein the molecular weight of the dispersing agent is 1000 to 50000.

[Claim 19]

An emulsion comprising disarranged fibers made of a thermoplastic polymer, and of 1 to 500 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios, and a solvent.

[Claim 20]

An emulsion comprising disarranged fibers made of a thermoplastic polymer, and of 1 to 200 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios, and a solvent.

[Claim 21]

An emulsion, according to claim 19 or 20, wherein the index Pb of extremal coefficient of the single fiber diameters expressing the rate of the fibers falling within a range of plus and minus

15 nm from the number average single fiber diameter defined as the median is 50% or more.

[Claim 22]

An emulsion, according to any one of claims 19 through 21, wherein the solvent is at least one selected from the group consisting of water, oils and organic solvents.

[Claim 23]

An emulsion, according to any one of claims 19 through 22, wherein the freeness of the disarranged fibers is 350 or less.

[Claim 24]

An emulsion, according to any one of claims 19 through 23, wherein the content of the disarranged fibers is 5 wt% or less.

[Claim 25]

An emulsion, according to any one of claims 19 through 23, wherein the content of the disarranged fibers is 0.0001 to 1 wt%.

[Claim 26]

An emulsion, according to claims 19 through 25, wherein the disarranged fibers are short fibers with a fiber length of 5 mm or less.

[Claim 27]

An emulsion, according to claim 26, wherein the disarranged fibers are short fibers with a fiber length of 0.05 to 0.8 mm.

[Claim 28]

An emulsion, according to any one of claims 19 through 27, wherein the thermoplastic polymer is at least one selected from the group consisting of polyesters, polyamides, polyolefins, polyphenylene sulfide, phenol resins, polyacrylonitrile, polyvinyl alcohol, polysulfones, polyurethanes, fluorine-based polymers and their derivatives.

[Claim 29]

An emulsion, according to any one of claims 19 through 28, which further contains a dispersing agent.

[Claim 30]

An emulsion, according to claim 29, wherein the content of the dispersing agent is 0.00001 to 20 wt%.

[Claim 31]

An emulsion, according to claim 29, wherein the content of the dispersing agent is 0.0001 to 5 wt%.

[Claim 32]

An emulsion, according to any one of claims 29 through 31, wherein the dispersing agent is at least one selected from the group consisting of nonionic dispersing agents, anionic dispersing agents and cationic dispersing agents.

[Claim 33]

An emulsion, according to claim 32, wherein the zeta potential of the disarranged fibers is in a range from -5 to +5 mV, and the dispersing agent is a nonionic dispersing agent.

[Claim 34]

An emulsion, according to claim 32, wherein the zeta potential of the disarranged fibers is -100 mV to less than -5 mV, and the dispersing agent is an anionic dispersing agent.

[Claim 35]

An emulsion, according to claim 32, wherein the zeta potential of the disarranged fibers is more than +5 mV to 100 mV, and the dispersing agent is a cationic dispersing agent.

[Claim 36]

An emulsion, according to any one of claims 29 through 35, wherein the molecular weight of the dispersing agent is 1000 to 50000.

[Claim 37]

A gel comprising disarranged fibers made of a thermoplastic polymer, and of 1 to 500 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios, and a solvent.

[Claim 38]

A gel comprising disarranged fibers made of a thermoplastic polymer, and of 1 to 200 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios, and a solvent.

[Claim 39]

A gel, according to claim 37 or 38, wherein the index Pb of extremal coefficient of the single fiber diameters expressing the rate of the fibers falling within a range of plus and minus 15 nm from the number average single fiber diameter defined as the median is 50% or more.

[Claim 40]

A gel, according to any one of claims 37 through 39, wherein the solvent is at least one selected from the group consisting of water, oils and organic solvents.

[Claim 41]

A gel, according to any one of claims 37 through 40, wherein the freeness of the disarranged fibers is 350 or less.

[Claim 42]

A gel, according to any one of claims 37 through 41, wherein the content of the disarranged fibers is 5 wt% or less.

[Claim 43]

A gel, according to any one of claims 37 through 41, wherein the content of the disarranged fibers is 0.0001 to 1 wt%.

[Claim 44]

A gel, according to claims 37 through 43, wherein the

disarranged fibers are short fibers with a fiber length of 5 mm or less.

[Claim 45]

A gel, according to any one of claims 37 through 43, wherein the disarranged fibers are short fibers with a fiber length of 0.2 to 1 mm.

[Claim 46]

A gel, according to any one of claims 37 through 45; wherein the thermoplastic polymer is at least one selected from the group consisting of polyesters, polyamides, polyolefins, polyphenylene sulfide, phenol resins, polyacrylonitrile, polyvinyl alcohol, polysulfones, polyurethanes, fluorine-based polymers and their derivatives.

[Claim 47]

A gel, according to any one of claims 37 through 46, which further contains a dispersing agent.

[Claim 48]

A gel, according to claim 47, wherein the content of the dispersing agent is 0.00001 to 20 wt%.

[Claim 49]

A gel, according to claim 47, wherein the content of the dispersing agent is 0.0001 to 5 wt%.

[Claim 50]

A gel, according to any one of claims 47 through 49, wherein the dispersing agent is at least one selected from the group consisting of nonionic dispersing agents, anionic dispersing agents and cationic dispersing agents.

[Claim 51]

A gel, according to claim 50, wherein the zeta potential of the disarranged fibers is in a range from -5 to +5 mV, and the

dispersing agent is a nonionic dispersing agent.

[Claim 52]

A gel, according to claim 50, wherein the zeta potential of the disarranged fibers is -100 mV to less than -5 mV, and the dispersing agent is an anionic dispersing agent.

[Claim 53]

A gel, according to claim 50, wherein the zeta potential of the disarranged fibers is more than +5 mV to 100 mV, and the dispersing agent is a cationic dispersing agent.

[Claim 54]

A gel, according to any one of claims 47 through 53, wherein the molecular weight of the dispersing agent is 1000 to 50000.

[Claim 55]

A cosmetic comprising the compound solution, emulsion or gel as set forth in any one of claims 1 through 54.

[Claim 56]

A paint comprising the compound solution, emulsion or gel as set forth in any one of claims 1 through 54.

[Claim 57]

A method for producing the compound solution, emulsion or gel as set forth in any one of claims 1 through 54, comprising the step of directly beating a fiber aggregate in at least one selected from the group consisting of water, oils and organic solvents.

[Claim 58]

A nanofiber synthetic paper comprising disarranged nanofibers made of a thermoplastic polymer, and of 1 to 500 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios.

[Claim 59]

A nanofiber synthetic paper comprising disarranged



nanofibers made of a thermoplastic polymer, and of 1 to 200 nm in the number average single fiber diameter and 60% or more in the sum Pa of single fiber ratios.

[Claim 60]

A nanofiber synthetic paper, according to claim 58 or 59, wherein the index Pb of extremal coefficient of the single fiber diameters expressing the rate of the fibers falling within a range of plus and minus 15 nm from the number average single fiber diameter defined as the median is 50% or more.

[Claim 61]

A nanofiber synthetic paper, according to any one of claims 58 through 60, wherein the freeness of the disarranged nanofibers is 350 or less.

[Claim 62]

A nanofiber synthetic paper, according to any one of claims 58 through 61, which has a weight per unit area of 50 g/m<sup>2</sup> or less.

[Claim 63]

A nanofiber synthetic paper, according to any one of claims 58 through 62, which has a thickness of 10 μm or more.

[Claim 64]

A nanofiber synthetic paper, according to any one of claims 58 through 63, which has a density of 0.3 g/cm<sup>3</sup> or less.

[Claim 65]

A nanofiber synthetic paper, according to any one of claims 58 through 64, which has a number average pore area of 1 μm<sup>2</sup> or less.

[Claim 66]

A nanofiber synthetic paper, according to any one of claims 58 through 65, which has an air permeability of 30 cc/cm<sup>2</sup>/sec or less.

[Claim 67]

A nanofiber synthetic paper, according to any one of claims 58 through 66, wherein the number of holes with a diameter of 50  $\mu\text{m}$  or more passing through from the front side to the reverse side of the synthetic paper is 0 to 1000 holes/ $\text{cm}^2$ .

[Claim 68]

A nanofiber synthetic paper, according to any one of claims 58 through 67, which has a surface smoothness of 300 seconds or more.

[Claim 69]

A nanofiber synthetic paper, according to any one of claims 58 through 68, wherein the thermoplastic polymer constituting the disarranged nanofibers has a melting point of 165°C or higher.

[Claim 70]

A nanofiber synthetic paper, according to any one of claims 58 through 69, wherein the thermoplastic polymer constituting the disarranged nanofibers is at least one selected from the group consisting of polyesters, polyamides, polyolefins, polyphenylene sulfide, phenol resins, polyacrylonitrile, polyvinyl alcohol, polysulfones, polyurethanes, fluorine-based polymers and their derivatives.

[Claim 71]

A nanofiber synthetic paper, according to any one of claims 58 through 70, which further contains at least 5 wt% or more of other fibers with a number average single fiber diameter of 1  $\mu\text{m}$  or more.

[Claim 72]

A nanofiber synthetic paper, according to any one of claims 58 through 70, which further contains other fibers with a number average single fiber diameter of 1  $\mu\text{m}$  or more, and 3 wt% or less of the disarranged nanofibers.

[Claim 73]

A nanofiber synthetic paper, according to any one of claims 58 through 70, wherein the disarranged nanofibers are laminated on a substrate.

[Claim 74]

A nanofiber synthetic paper, according to claim 73, wherein the substrate is selected from a woven fabric, knitted fabric, nonwoven fabric and foam.

[Claim 75]

A compound synthetic paper comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 76]

A molded synthetic paper comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 77]

A filter comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 78]

A separator comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 79]

An abrasive comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 80]

A medical product comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 81]

A circuit board comprising the nanofiber synthetic paper as set forth in any one of claims 58 through 74.

[Claim 82]

A method for producing a nanofiber synthetic paper by forming a paper sheet from a dispersion of beaten short nanofibers, characterized in that the paper sheet is formed without using a binder.

[Claim 83]

A method for producing a nanofiber synthetic paper, characterized in that other fibers with a number average single fiber diameter of 1  $\mu\text{m}$  or more are processed to form a paper sheet using disarranged nanofibers as a binder.